

Early Cognitive Stimulation, Emotional Support, and Television Watching as Predictors of Subsequent Bullying Among Grade-School Children

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Background: Bullying is a major public health issue, the risk factors for which are poorly understood.

Objective: To determine whether cognitive stimulation, emotional support, and television viewing at age 4 years are independently associated with being a bully at ages 6 through 11 years.

Methods: We used multivariate logistic regression, using data from the National Longitudinal Survey of Youth, to adjust for multiple confounding factors.

Results: Parental cognitive stimulation and emotional support at age 4 years were each independently protective against bullying, with a significant odds ratio of 0.67

for both variables associated with a 1-SD increase (95% confidence interval, 0.54-0.82 for cognitive stimulation and 0.54-0.84 for emotional support). Each hour of television viewed per day at age 4 years was associated with a significant odds ratio of 1.06 (95% confidence interval, 1.02-1.11) for subsequent bullying. These findings persisted when we controlled for bullying behavior at age 4 years in a subsample of children for whom this measure was available.

Conclusion: The early home environment, including cognitive stimulation, emotional support, and exposure to television, has a significant impact on bullying in grade school.

Arch Pediatr Adolesc Med. 2005;159:384-388

BULLYING AMONG CHILDREN IN schools around the world has received emphasis recently as a serious public health problem. Bullying affects between 8% and 50% of children around the world,¹⁻⁷ with a recent US estimate of about 30%.⁸ Despite decades of research, there are still gaps in our understanding of bullying. In particular, we know little about what environmental factors predispose children to become bullies.

Children's early home environments have been shown in many studies to be strongly associated with the subsequent development of antisocial behavior problems.⁹ This research has focused on the emotional support that parents provide to young children, which assists the development of empathy, self-regulation, and prosocial skills.⁹⁻¹³ Very little research has examined the links between the early home environment and subsequent bullying behavior in particular. Existing literature suggests that 3 specific early childhood predictors might play a role in the development of subsequent bullying: cognitive stimulation, emotional support, and television exposure.

Recent theoretical work suggests that bullying might arise out of early cognitive deficits—including language problems, imperfect causal understanding, and poor inhibitory control—that lead to decreased competence with peers, which over time develops into bullying.^{14,15} A small number of studies provide circumstantial evidence that such a hypothesis might have merit:⁷ 1 study found a link between poor early cognitive stimulation and (broadly defined) inappropriate school behavior,¹⁶ and another found cognitive stimulation at age 3 years to be protective against symptoms of attention-deficit disorder at age 7 years.¹⁷ A study of Greek children found that academic self-efficacy and deficits in social cognition were related to bullying behavior.¹⁸ A large US national survey found that those who perceive themselves as having average or below-average academic achievement (as opposed to very good achievement) are 50% to 80% more likely to be bullies.⁸ Yet these studies are based on cross-sectional surveys, with the variables all measured at a single point in time.

The hypothesis that early emotional support is associated with subsequent bullying is also plausible theoretically¹⁶ and

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has received circumstantial empirical support. Parenting style has been associated with contemporaneous bullying in cross-sectional studies,^{19,20} and maltreatment is associated with bullying.²¹ Accordingly, the noted cross-sectional association between parenting style and bullying could be biased by reverse causality.

By contrast, a clear consensus in the literature indicates that there is a causal role for television violence in producing aggressive behavior,²²⁻²⁶ although only 1 study²⁷ specifically correlated television viewing with bullying behavior and this in a Swiss cross-sectional sample with self-report of both media use and bullying.

On the basis of this previous theoretical and empirical work, we hypothesized that (1) early cognitive stimulation, (2) early parental emotional support, and (3) early viewing of television would predict subsequent bullying behavior, controlling for baseline bullying. It is important that these hypotheses be tested simultaneously. Each main predictor is likely to be correlated with the others, as well as potentially with the outcome of bullying, so that each main predictor also functions as a potential confounder of the other 2 relationships.²⁸ The task of this analysis is to determine whether each predictor constitutes an independent risk factor for subsequent bullying. Accordingly, these hypotheses were tested in a multivariate model using survey data from a nationally representative longitudinal data set.

METHODS

DATA SOURCE

Data from this study were drawn from the National Longitudinal Survey of Youth 1979 Children and Young Adults (NLSY-Child), an outgrowth of the original National Longitudinal Survey of Youth 1979 (NLSY79). The NLSY79, sponsored by the US Department of Labor, began with a nationally representative sample of almost 12 700 individuals ages 14 through 22 years in 1979 who have been interviewed annually or biennially since.^{29,30} African American and Latino individuals were oversampled to provide statistical power for analyses involving these important subgroups, and population weights were available to draw valid national inference. Conducted biennially from 1986 through 2000, the NLSY-Child developed an extensive collection of information for more than 11 000 children of the female respondents to the NLSY79 regarding developmental assessment, family background, home environment, and health history.³¹ Information for the NLSY-Child was obtained from both the mother and child, depending on the child's age. The records from NLSY79 and NLSY-Child are linkable via the mother's sample identification number. Data from both the NLSY-Child and NLSY79 were pulled for this study using the CHRR Database Investigator Software (Center for Human Resources Research, Columbus, Ohio).

Our sample consisted of all children who were aged 6 to 11 years (72-143 months) at the time of the 2000 survey interview. The University of Washington (Seattle) institutional review board determined that this research was exempt from review because it used only previously collected, unlinked data.

OUTCOME MEASURE

Our outcome measure involved characterization of a child as a bully by his or her mother. The statement was, "[name of child]

bullies or is cruel or mean to others," and possible responses were "often true," "sometimes true," or "not true." We grouped together the "sometimes true" and "often true" responses as positive for bully status and "not true" as negative for bully status.

A recent methodological piece on the identification of children who bully suggested that the use of a single-item question is the method of choice for prevalence estimation of bullying.³² The same article discusses the construct validity of the preferred measure by assessing the correlation between bullying and an antisocial measure. Solberg and Olweus³² found that identified bullies have a mean externalizing score that is approximately 1 SD higher than that for nonbullies, and the difference is significant at $P < .001$. (Externalizing behavior refers to problem behaviors such as antisocial behavior, oppositional behavior, hyperactivity, and so on.) As a check on our own measure of bullying, we performed the same analysis using the short-form Behavior Problems Index, which includes a validated antisocial score for each child.³¹ (We revised the Antisocial scale by subtracting the values of the answers to the bullying question, which would otherwise contribute to the Antisocial score.)

In our data, the antisocial score is about 1.3 SDs higher among the bullies than nonbullies, and the difference is significant at $P < .001$. Of the children in our sample, 13% were identified as bullies, which is similar to a recent national estimate of prevalence of 19%.⁸ We therefore conclude that the maternal report of bullying is a reasonable and informative assessment of true bullying behavior.

MAIN PREDICTORS

Our first 2 main predictors were the cognitive stimulation and emotional support subscales of the Home Observation for Measurement of the Environment–Short Form, measured at age 4 years. These subscales have been shown to have good psychometric properties and have been used extensively in child development research.^{31,33,34} They include both maternal-report and interviewer-report items. The cognitive stimulation score generally includes items related to outings, reading, playing, and the parental role in teaching a child. For younger children, the emotional support score consists of elements related to eating meals with both parents, parents talking to the child while working, and spanking. To facilitate interpretation, scores were normalized so that a 1-unit change in the variable represents a 1-SD change.

Our third main predictor variable was the weekly average number of hours of television watched per day. As of 1990, mothers were asked the number of hours of television that the child (younger than 10 years) watches on a typical weekday and on a typical weekend day. When a response indicated no television in the home, television viewing hours were set to 0. When a response indicated more than 16 hours of viewing per day, the viewing was capped at 16 hours. The number of hours per week was computed as 5 times the number of hours watched during a typical weekday plus 2 times the number of hours watched on a typical weekend day. To get a daily average, we divided this number by 7. This computation was performed for the survey year occurring closest to the 4-year birthday of each child.

COVARIATES

We include as potential confounders any variable that has been shown to be associated with bullying and has also been shown to be associated with any of the 3 main predictors. Bullying behavior has been shown to vary with the child's race, age, and sex,^{7,8,32} as has the amount and type of television viewing.^{35,36} The association between bullying and socioeconomic status, including parental income and education, has not been explic-

Table 1. Descriptive Statistics of Variables by Bullying Status in Grade School*

	Full Sample (n = 1266)	Bullies (n = 172)	Nonbullies (n = 1094)	P Value of Difference
Child reported to be a bully	0.13 ± 0.34			
Cognitive stimulation score at age 4 years	6.17 ± 1.00	5.77 ± 1.00	6.23 ± 1.00	<.001
Emotional support score at age 4 years	6.28 ± 1.00	5.86 ± 1.00	6.34 ± 1.00	<.001
Television viewing at age 4 years, h/d	3.47 ± 3.92	5.03 ± 3.92	3.23 ± 3.92	.004
Log of parental income	10.75 ± 0.99	10.57 ± 0.99	10.78 ± 0.99	.02
Parental education	13.96 ± 2.38	13.48 ± 2.38	14.03 ± 2.38	.02
Age, y	9.19 ± 1.66	9.37 ± 1.66	9.17 ± 1.66	.18
Female, %	48.7	42.4	49.6	.09
African American, %	11.2	13.4	10.9	.28
Native American, %	3.9	4.3	3.9	.83
Latino, %	5.0	4.4	5.1	.61
Asian, %	0.5	0.7	0.5	.71
	(n = 641)	(n = 145)	(n = 496)	
Child reported to be a bully at age 4 years, %	22.6	55.7	16.7	

*Values are mean ± SD unless otherwise indicated.

Table 2. Regression of Bullying in Grade School on Early Predictors—Full Sample (n = 1266)*

Predictors	OR (95% CI)
Television viewing at age 4 years, h/d	1.06 (1.02-1.11)
Cognitive stimulation score at age 4 years	0.67 (0.54-0.82)
Emotional support score at age 4 years	0.67 (0.54-0.84)

Abbreviations: CI, confidence interval; OR, odds ratio.

*Model adjusted for child's age, sex, and race or ethnicity and parents' income and education.

itly explored, but socioeconomic status has been shown to be strongly associated with externalizing behavior generally.²⁸ Socioeconomic status is also known to influence both television viewing and parenting style.^{22,36} Model covariates therefore included the child's sex; race (Hispanic, African American, or non-Hispanic/non-African American); the child's age when the bullying question was asked in 2000; and the parents' income and educational levels.

It is of course possible that parents find it more difficult to parent children who for other reasons (eg, genetics) display more antisocial or bullying behavior early on. If so, early bullying might prompt reduced emotional support and cognitive stimulation by the parents and more television viewing. To control for this possibility, we include our measure of bullying at age 4 years, measured contemporaneously with the main predictors (ie, early parental cognitive stimulation, emotional support, and television viewing). Doing so controls for possible confounding in the association between early predictors and subsequent bullying by predisposition to bully. Unfortunately, the early bullying measure was available only on a subsample of children, so this model was conducted as a separate subanalysis, with reduced power.

MODELING

After examining the univariate characteristics of the independent variables, we ran 3 multivariate logistic regression models. The first model included all children ages 6 through 11 years. The second included only those children for whom age 4 years bullying data were available. All analyses were performed using Intercooled Stata 8.0 (Stata Corp, College Station, Tex).

RESULTS

A total of 1266 6- through 11-year-old children had complete data for the basic set of variables, and 641 children had complete data for the early bullying control variable. **Table 1** presents descriptive statistics for all variables. Approximately 49% were female, and 11% were African American; 9% were Native American, Latino, or Asian; and the remainder were white. Approximately 13% of children were reported as bullies by their mothers.

The cognitive stimulation and emotional support scores at age 4 years were each approximately 0.5 SDs higher among those who were subsequently reported in grade school to be nonbullies than among those who were subsequently reported to be bullies. Children at age 4 years had watched an average of 3.5 hours of television per day, with a mean of 5.0 among subsequent grade-school bullies and 3.2 among subsequent nonbullies. All of these differences were significant at $P < .01$.

Table 2 presents the results of the logistic regression model for all children, without controlling for early bullying. The odds ratios associated with cognitive support and emotional stimulation at age 4 years were each 0.67 (95% confidence interval [CI], 0.54-0.82, and 95% CI, 0.54-0.84, respectively). The odds ratio associated with each hour of television per day was 1.06 (95% CI, 1.02-1.11). We also controlled for parental income and education and the child's age, sex, and race or ethnicity. Of these, only being African American was significant, showing an association with decreased bullying (odds ratio, 0.50 [95% CI, 0.29-0.87]) (not reported in the table).

In the regression on the subset of children with data available on early bullying (**Table 3**), early television viewing was significantly predictive of subsequent bullying, with an odds ratio of 1.09 per hour watched per day (95% CI, 1.01-1.17). Emotional support was protective, with an odds ratio of 0.75 per 1-SD change in the subscale (95% CI, 0.56-0.99). Cognitive stimulation was not significant, with an odds ratio of 0.81 (95% CI, 0.62-1.05).

We found that early (age 4 years) cognitive stimulation, emotional support, and exposure to television were each independently associated with subsequent maternal report that the child was considered a bully at grade-school age. This finding was present even while controlling for a number of potential confounding factors, including socioeconomic status and the child's age, race or ethnicity, and sex. The magnitudes of the emotional support and cognitive stimulation scores were meaningful, with a 1-SD increase in each of these scores at age 4 years associated with a 33% decrease in the odds of being a bully in grade school. The magnitude of the risk associated with television, expressed in our analysis in terms of hours per day of television viewed, is clinically significant, particularly when one considers that the SD of hours per day of television viewing was 3.9. Accordingly, a 1-SD increase in the number of hours of television watched at age 4 years is associated with an approximate 25% increase in the probability of being described as a bully by the child's mother at ages 6 through 11 years.

When we included a control for bullying behavior at age 4 years (ie, maternal report of whether the child is a bully), the results are similar. This result provides added confidence that the associations identified in this analysis are not confounded by 1 obvious possibility, that of early bullying driving parenting choices. Instead, these results are consistent with a causal role for early emotional support (as a protector) and early television viewing (as a risk factor) in the subsequent development of bullying. Although the effect of early cognitive stimulation did not achieve statistical significance in the model that controls for early bullying, that finding might be partly caused by the reduced sample size.

To our knowledge, this is the first study to test the hypothesis that early emotional support, cognitive stimulation, and television viewing are associated with subsequent bullying. The fact that the data are from a representative longitudinal data set and that the analysis controls for multiple possible confounding variables makes these findings even more compelling.

The fact that early cognitive stimulation is protective against bullying in our data corroborates theoretical work in this area. The benefits of early cognitive stimulation might function through an increase in a child's comfort level and confidence around academic matters or through the child's perception that the parents endorse the academic project of schooling. As a result, the child might be less inclined to disrupt the schooling process by bullying others. Clearly, this conjecture needs further research to clarify, but this result is consistent with other research that has found considerable benefits to early childhood education programs such as Head Start. It is also possible that a high score on the cognitive stimulation subscale is a proxy for a broad range of nurturing parental behaviors that are eventually associated with prosocial behavior, such as positive interactions with peers and teachers.

The role of early television viewing is particularly provocative because of the emphasis in the existing literature on television viewing among older children, such

Table 3. Regression of Bullying in Grade School on Early Predictors and Early Bullying (n = 641)*

Predictors	OR (95% CI)
Television viewing at age 4 years, h/d	1.09 (1.01-1.17)
Cognitive stimulation score at age 4 years	0.81 (0.62-1.05)
Emotional support score at age 4 years	0.75 (0.56-0.99)
Bullies at age 4 years	5.94 (3.47-10.15)

Abbreviations: CI, confidence interval; OR, odds ratio.

*Model adjusted for child's age, sex, and race or ethnicity and parents' income and education.

as 9-year-olds or adolescents. Most of the literature concluding that television is associated with increased aggression deals only with violent media, not media or television in general. However, approximately 60% of television programs contain violence,³⁷ so the number of television hours watched likely correlates with the overall number of violent television hours viewed. Perhaps some programming that is not explicitly violent also leads to bullying behavior. For example, some programs contain examples of people behaving disrespectfully toward one another, which could serve as a model for children to engage in the kind of verbal abuse that qualifies as bullying in most definitions.^{1,32} Because watching television can be habit-forming, parents should be encouraged to limit the television viewing of their young children in accord with American Academy of Pediatrics guidelines,³⁸ which recommend no television for children younger than 2 years old and limited television thereafter.

There are several limitations to this study. First, previous research has relied on student self-reporting bullying status, whereas this study used maternal reports. Moreover, in previous work, the definition of the term *bully* has been provided to those asked to assess whether someone is a bully. Here, by contrast, we did not provide the definition of *bully* to the mothers filling out the surveys. Not everyone has the same definition of the word. It is possible that mothers would report their children as bullies if they fought a lot, which, although an example of antisocial behavior, might not fit the usual definition of bullying, which must involve some kind of physical, social, or psychological power imbalance. If mothers of children who fight a lot—but in the absence of power imbalances—report their children as bullies, it would accordingly account for at least some of the correlation reported earlier between the antisocial and bullying measures. In this sense, there might be “false positives,” or type II errors, in the bullying measures used.

At the same time, mothers might differ in their willingness to admit that others consider their children to be bullies, especially if they disagree with that label. Hence, we were probably unable to identify all true bullying children in the sample, which would introduce false negatives, or type I errors. The measure of bullying used in this study might accordingly be subject to measurement error. In general, measurement error tends to decrease the ability to detect an effect that is in fact present and therefore introduces a conservative bias.³⁹

Second, it is possible that there are unmeasured characteristics associated with parents who provide low levels of cognitive stimulation or emotional support and who allow their children to watch excessive television and that these unmeasured characteristics account for the relationships between these early variables and subsequent bullying. To mitigate the effects of such a possibility, we included in a second regression a measure of whether the child was a bully at baseline. However, it is possible that this measure undercontrols for the child's true baseline risk of subsequent bullying behavior.

Finally, we have no data on the content of the television watched by these children.

CONCLUSIONS

Our results have some important implications. First, we have provided some empirical support to theories that suggest that bullying might arise out of cognitive deficits as well as emotional ones. Second, we have added bullying to the list of potential negative consequences of excessive television viewing along with obesity, inattention, and other types of aggression.^{17,40-44} Third, our findings suggest some steps that can be taken with children to potentially help prevent bullying. Maximizing cognitive stimulation and limiting television watching in the early years of development might reduce children's subsequent risk of becoming bullies. The early childhood period is an important formative time for the subsequent behavior of children. Future research will be valuable in reproducing and refining these findings and in identifying the precise causal mechanisms involved. In particular, research on how particular television content might affect bullying is essential.

Accepted for Publication: December 13, 2004.

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